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Appendix I.

[Vide answer to question No. 120 asked by Mr. G. Harisarvottama Rao at the meeting of the Legislative Council held on the 5th September 1928, page 229 supra.]

Report.

[*Subject.*—Legislative Council Question No. 206—Tungabhadra Project—Investigation—Progress.]

The situation as regards the investigation of the Tungabhadra Project, when I took charge on 30th April 1928, was that—

(*a*) the site of proposed dam had been inspected by a Geologist and the Chief Engineer for Irrigation and an approximate line decided upon;

(*b*) some 30 to 40 square miles of levelling in the proposed reservoir basin had been completed;

(*c*) trenches, borings, etc., to investigate the suitability of rock on dam site had not been commenced.

2. A proposition statement of staff required was submitted by me on 15th May 1928, and the sanction of Government in G.O. No. 1663, dated 7th July 1928, received on 26th July 1928.

In the meantime, work was proceeded with as expeditiously as possible with the staff available.

Three factors must be ascertained definitely before it is possible to outline a scheme of this nature or take up work on the survey of canal lines, channels, area to be irrigated, etc. These factors are—

(*a*) The run off or flow of river. This is known fairly accurately from gaugings over a period of years.

(*b*) That the site proposed for the dam is feasible from an engineering and geological point of view. That is to say that a foundation of hard, impermiable rock is available for the length and breadth of dam at a reasonable depth.

(*c*) The capacity of proposed reservoir at different heights of dam must be known accurately.

Taking factor (*b*).

3. Trenches seven in number have been dug on the Madras side of the river.

The results so far obtained are not satisfactory, the rock opened up is a schist dipping at approximately 60° down-stream, in other words, it is a laminated rock standing almost on end and through which the absorbtion is likely to be enormous under the pressure of a big head of water.

Further much of this rock softens on exposure to air and disintegrates under water.

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The Geologist in his report stated that probably a more compact rock would be met with below, presumably he meant a more compact rock of the same nature as naturally would be expected under the pressure of depth.

It is, however, I think, doubtful if schists of this nature will make a suitable foundation at any depth.

In order to ascertain definitely, if suitable rock does exist at what may be termed a reasonable depth three pits or wells are now being sunk in three of the trenches already excavated and to a depth of 50 feet. It is a matter of difficulty getting work done quickly in this out-of-the-way spot; population is scanty, and labour has to be imported, the conditions with the south-west monsoon also make matters more difficult. I cannot under the circumstances count on these wells being sunk under two months from date; the result will be at once reported.

It will of course be necessary to make sure by further pits and borings that suitable foundations exist under the whole length and breadth of dam, even if the pits now being excavated give good results but as geologically the formation is the same all over, it will be possible to state fairly definitely whether a dam is or is not feasible.

4. Factor (*c*).

To arrive at accurate figures of capacity of reservoir, it is necessary to take levels in the shape of cross sections over about 350 square miles of country; (approximately half of this is in the Bombay Presidency), about 170 square miles have been levelled to date and more rapid progress is expected as more staff is now arriving.

Here again progress is somewhat retarded by the south-west monsoon, the high wind and rain render it impossible at times to use a levelling instrument; the river is in flood and frequently impossible to cross; communication is very difficult, accommodation and food for the supervisors employed is difficult to obtain and the area being malarious incapacity of staff frequent.

It is estimated that it will take a further $2\frac{1}{2}$ to 3 months before the survey of the reservoir basin is complete and work can be started on preparation of a draw-off statement of water available.

5. It is proposed, once factors *b* and *c* are definitely known and feasible to outline a scheme with approximate costs for the consideration of Government. It should be possible to submit this by March 1929. Part of the staff will be employed on this; the remainder will go ahead with surveys of canals and channel lines, etc., putting down of trial pits and borings and the collection of data generally, necessary, in a large scheme of this nature, before accurate and detailed plans and estimates can be drawn up.

6. Possible canal lines have been inspected by me so that survey parties will be able to go straight ahead.

From where the main canal to Bellary and Anantapur meets the Sandur hills to as far as Daroji (some 25 miles), the line is likely to be very difficult and expensive, heavy cutting and some tunnelling is unavoidable.

The main canal is likely to be at a higher level than the old Tungabhadra Project canal, in order to lessen heavy cutting further down between the

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Hagari and Pennar rivers and onwards to where it will debouch into the Anantapur plain (about 30 miles) this portion is difficult and expensive ; the country to be crossed being hilly.

The crossing of the Pennar river which lies in a deep valley will also be a difficult and expensive business.

On the other hand once water can be got through in large quantities, there appears to be an almost unlimited area of red and mixed soils suitable for irrigation in the Anantapur and Dharmavaram taluks of Anantapur district.

7. Generally speaking provided rock be found at dam site suitable to build a heavy masonry water holding structure on it is considered that the scheme likely to be feasible but expensive. Apart from the nature of the rock, the construction of dam presents many engineering difficulties. The main dam would be approximately 10,000 feet long and subsidiary dams on either side would also be necessary. The cost, it is thus obvious, is likely to be very high. The site cannot compare with the old Mallapuram site near Hospet, any benefits to be gained lie in possibly increased storage and the irrigation of some 50,000 acres in the Western taluks of Bellary.

F. W. IRELAND,
Executive Engineer, Tungabhadra Project Dn., Bellary.

APPENDIX II.

[Vide answer to question No. 138 asked by Mr. C. N. Muthuranga Mudaliyar at the meeting of the Legislative Council held on the 5th September 1928, page 240 supra.]

Serial number and name.	Designation.	Amount of fine. RS.	A.	P.	Reasons.
1. V. C. Velu	Compositor ..	0	8	0	Failure in attending to corrections and disobeying instructions.
2. G. Govindarajalu ..	Do. ..	0	2	0	Bad work.
3. S. P. Appadorai ..	Do. ..	0	2	0	Careless work.
4. R. Mohanraj ..	Do. ..	0	2	0	Do.
5. S. Govindarajalu ..	Do. ..	0	2	c	Do.
6. A. M. Govindarajulu.	Do. ..	0	2	0	Disobeying instructions.
7. V. C. Velu	Do. ..	0	3	0	Bad and careless work and delaying the machine nearly for one hour.
8. G. Govindarajalu ..	Do. ..	0	2	0	Leaving work and loitering upstairs and uttering falsehood when enquired.
9. S. Kuppuswami ..	Do. ..	0	4	0	Careless corrections.
10. C. Ratnasabapathy ..	Do. ..	0	6	0	Failure in attending to corrections.
11. C. Babu	Do. ..	0	4	0	Careless corrections in Budget work.
12. T. Govindarajalu ..	Do. ..	0	8	0	Disobeying orders.
13. S. C. Doraisingam ..	Do. ..	0	2	0	Do.